ACE **Assessments
in Career
Education**

Guide
for Teachers

Computer Science and
Information Systems

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2000

Introduction

About This Guide

The *Assessments in Career Education* (ACE) *Guide for Teachers* has been developed to provide essential information and preparation guidelines for teachers. The intent of the guide is to serve as an instructional aid in the classroom. The guide is divided into seven sections:

Test Content — describes the content of the test.

Test Structure — describes the general format of the test.

Test Preparation — includes strategies for preparing students for taking an ACE examination, including written-response questions.

Achievement Levels — describes the six different levels of achievement.

Sample Questions — includes sample multiple-choice questions and a sample written-response question.

General Scoring Criteria — shows the general criteria used to develop specific scoring guides for written-response questions.

Sample Student Work — includes examples of student work for the sample written-response question at different score points with commentary.

Teachers are encouraged to reproduce portions or all of the guide for classroom use.

Student Eligibility

The ACE in Computer Science and Information Systems may be taken by a student only one time. For this reason, it is important for students to take the examination when they are fully prepared. Prior to taking the examination, students should complete the appropriate coursework that provides instruction in all of the standards covered by the examination.

Test Content and Structure

Test Content

The ACE in Computer Science and Information Systems is based upon the knowledge and skills defined in the *Draft Interim Content and Performance Standards of the Superintendent's Challenge Initiative for Business Education, Grades 11-12, Computer Science and Information Systems Career Path Cluster.* These standards, as summarized below, share a substantial amount of content with their predecessor, the *Business Education Career Path and Model Curriculum Standards.*

The content of this examination covers:

* the information-processing concepts necessary to gather, create, and analyze data

* the support services necessary to operate an office in a global society

* systems and programming concepts related to the science of computer operations, including computer systems and programs

* computerized information systems, including the evaluation and use of hardware and software solutions to improve productivity

* telecommunications concepts and systems

Test Structure

The ACE in Computer Science and Information Systems is administered in two 45-minute sessions. Each session consists of multiple-choice questions and a written-response question.

The purpose of the multiple-choice questions is to assess students' knowledge of computer science and information systems. The multiple-choice questions vary in complexity. Some require students to apply concepts to solve problems. This portion of the examination is machine scored. Sample questions are provided on page 5.

The written-response questions are designed to measure students' application of skills and knowledge. Students respond in writing to questions about career-related situations. The written-response questions are scored by computer science and information systems teachers and other professionals in the career area. Students are awarded a score point from one to four for each question, with four being the highest score. The sample multiple-choice and written-response questions, general scoring criteria, and sample student work and commentary are provided on pages 5–8.

Resource Documents

Copies of the *Draft Interim Content and Performance Standards of the Superintendent's Challenge Initiative for Business Education, Grades 11-12, Computer Science and Information Systems Career Path Cluster* are available at http://www.cde.ca.gov/challenge on the Internet.

Copies of the *Business Education Career Path and Model Curriculum Standards* are available from the Publications Division, Sales Unit, California Department of Education, P.O. Box 271, Sacramento, CA 95812-0271 or by fax at (916) 323-0823.

Test Preparation

Students should have a firm foundation in the essential skills needed for success in the career area tested. Sound preparation for ACE is built on classroom assignments that allow students to use and test their skills and knowledge regularly.

Students preparing for the examinations need to be able to articulate the major concepts in the career area being assessed. They must be able to analyze information, apply knowledge, solve problems, and explain their solutions.

Preparing Students for Written-response Questions

Using the sample written-response question in this guide (page 5):

- discuss the wording of the sample written-response question. Help students to identify and understand the key requirements of the question (i.e, what is being asked?).

- review the general scoring criteria (page 6) with students. This will help students better understand what is expected of them.

- discuss the student work samples. Focus on the differences between the score points.

In addition:

- plan a variety of classroom activities that require students to interpret, think through, and answer written-response questions. For example:

  – define and explain terms that are common in written-response questions (e.g., "in detail," "fully," "list" vs. "describe" vs. "explain").

  – model processes for "thinking through" and outlining answers to written-response questions.

  – model processes for incorporating details into answers to written-response questions.

- provide students with many opportunities to practice writing (e.g., through homework assignments, in-class projects, and classroom assessments).

- involve students in developing written-response questions and scoring guides related to content covered in your curriculum.

- have students evaluate their own answers to written-response questions, as well as the answers of their peers, using a scoring guide. Encourage students to discuss strategies for improving their own and others' work.

- allow students to revise/improve their answers to written-response questions, based on your feedback and/or the feedback of their peers.

As an instructor:

- when you help prepare your students for the written portion of the ACE examination, you are also helping them to become better writers.

- keep in mind that you can effectively impact your students' writing as you engage them in writing about real-world activities.

- resources at your school that are available to help enhance your students' writing skills include:

  – the *English-Language Arts Content Standards for California Public Schools* adopted by the California State Board of Education (http://www.cde.ca.gov/board/standards.html), in particular, the sections entitled "Writing" and "Writing and Oral English Language Conventions."

  – any writing initiatives currently being implemented at your high school.

  – the language arts and English language learner instructors at your high school and/or in your career cluster.

Test-taking Strategies

Several test-taking strategies may be helpful to students during an ACE examination.

When answering multiple-choice questions, students should:

- read the directions carefully.

- generate their own idea of the most accurate answer to a question before selecting from the answers provided.

- pace themselves by considering the number of questions and the time allowed.

When answering written-response questions, students should:

- read and understand all parts of the question.

- underline the key requirements of the question.

- think quickly of the main ideas that will serve as a framework for their response.

- briefly outline the main ideas in a logical sequence before responding.

- respond to all parts of the question.

- provide accurate, clear, and detailed examples that demonstrate their knowledge of the career-area topic covered.

- check their work when finished to make sure they have responded to all required components of the question.

Achievement Levels

Scores from the multiple-choice and written-response portions of the examination are combined to produce the student's overall achievement level. There are six achievement levels. Students who achieve level six are awarded high honors; those who achieve level five are awarded honors; and those who achieve level four are awarded recognition. Students who achieve level three or below are acknowledged for their participation.

Level 6

The student has demonstrated excellent knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show excellent knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate superior interpretive, analytical, and problem-solving skills.

- present accurate information and ideas in a detailed, well-organized manner.

Level 5

The student has demonstrated strong knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show substantial knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate very good interpretive, analytical, and problem-solving skills.

- present information and ideas in an organized and accurate manner.

Level 4

The student has demonstrated solid knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show solid knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate good interpretive, analytical, and problem-solving skills.

- present information and ideas in an organized manner with minor errors or omissions.

Level 3

The student has demonstrated basic knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show basic knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate some interpretive, analytical, and problem-solving skills.

- present information and ideas in a somewhat organized manner with some errors, misconceptions, and/or omissions.

Level 2

The student has demonstrated limited knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show limited knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate limited interpretive, analytical, and problem-solving skills.

- present limited information; may lack organization and/or have misconceptions, errors, and omissions.

Level 1

The student has demonstrated little or no knowledge, understanding, and application of the content and concepts of computer science and information systems. The responses:

- show minimal knowledge and understanding of the concepts of computer science and information systems.*

- demonstrate little or no interpretive, analytical, and problem-solving skills.

- present little or no information and have misconceptions and errors.

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* A detailed description of the content covered by the ACE in Computer Science and Information Systems can be found on page 1.

Sample Test Questions

Sample Multiple-choice Questions

1. You did an Internet search for a non-profit association or club and came up with four possibilities. Which of the following is MOST likely the final part of its address?

   A. qnet.org

   B. qnet.com

   C. qnet.ind

   D. qnet.gov

2. As an administrative assistant to an insurance adjuster, you must create and send letters to clients within two days of the adjuster's visit to them. Which software applications would be BEST to use in this situation?

   A. database and presentation

   B. telecommunications and desktop publishing

   C. word processing and database

   D. word processing and desktop publishing

ANSWER KEY: 1. A   2. C.

Sample Written-response Question

Your company has purchased new computer hardware and software to upgrade the management systems. It will be installed in two weeks.

- Discuss **three** issues you should consider to make sure the installation goes smoothly.

- Describe how each issue could be handled.

What Students Are Expected to Accomplish

In their response to this question, students are expected to identify three appropriate issues for making sure the installation of hardware and software goes smoothly and to discuss each in detail. The response is scored on the depth of understanding of potential system problems and of installation and configuration of computer systems. Additionally, responses are expected to be well organized and clearly and effectively written.

General Scoring Criteria for Written-response Questions and Problem-solving Tasks

The general criteria for each score point are outlined below. These criteria are used to develop scoring guides that address the specific content in each written-response question or problem-solving task.

Score Point 4

Student response shows **excellent** knowledge and understanding. The response:

- completes all components of the question correctly.

- demonstrates in-depth understanding of relevant concepts.

- conveys knowledge coherently and effectively.

Score Point 3

Student response shows **substantial** knowledge and understanding. The response:

- completes all or most components of the question correctly.

- demonstrates understanding of relevant concepts; may overlook or misunderstand less important ideas.

- conveys knowledge clearly.

Score Point 2

Student response shows **partial** knowledge and understanding. The response:

- completes some important components of the question correctly.

- overlooks or misunderstands relevant concepts.

- conveys knowledge in a manner that may lack clarity.

Score Point 1

Student response shows **little or no** knowledge and understanding. The response:

- attempts to address important component(s) of the question but may do so incorrectly.

- demonstrates little or no understanding of relevant concepts.

- conveys knowledge in a manner that may lack clarity or focus or may impede understanding.

Sample Student Work

Score Point 4

The first issue that one must consider when upgrading hardware and software systems is compatibility. The hardware must be compatible with the software and powerful enough to run it. The latest software is extremely demanding, for example WinNT 4.0 requires 32 megabytes of RAM to simply get started. Obviously having 16 megabyte machines will cause company-wide problems. Also, some software is processor-specific. Applications which will run on Alpha will not run on Intel. You must make certain that the software and hardware are compatible.

The second issue is ease of installation. Driver concerns and Plug & Play concerns both go into this. Experienced system administrators should install the software, making sure the settings are correct. The hardware and network itself must be installed correctly as well.

The last issue is support. Getting hardware and software from reputable companies is very important when upgrading on a large scale. If something goes wrong with the OS that has been installed there must be a technical support team available to solve the problem. When paying for hardware and software, you are paying largely for support. The few hundred dollars that may be saved is not worth the hours of frustration that a consistently crashing system causes.

Commentary

This response demonstrates in-depth understanding of potential system problems that can occur during the installation and configuration of new computer systems. The response identifies three appropriate issues: hardware and software compatibility, use of experienced personnel, and short-term and long-term technical support. The response explores the three issues in detail, citing examples and describing how each issue might be handled. The knowledge is conveyed coherently and effectively.

Sample Student Work

Score Point 3

Three issues one might encounter are compatibility problems with old software and data, network configuration and user understanding.

To deal with old data, I would check with the hardware and software companies compatibility list.

The network issue would be resolved by properly installing the devices and software. I would install them using the manuals and check with the companies for help.

The users would need to learn this software and hardware. I would distribute manuals, send email, and give training courses for the users.

Commentary

This response identifies three appropriate issues: compatibility with old software and data, configuration of the network, and training of personnel. The discussion of each issue is somewhat general and no specific examples are given. Overall, however, the response shows a good understanding of potential system problems and of installation and configuration of computer systems. The knowledge is conveyed clearly.

Score Point 2

To smooth installation, one should consider down time, installation and trouble shooting. There will be down time while hardware and software is installed, and affected employees should be notified prior. Installation should be done by someone who has knowledge of what he or she is doing, and someone should be on hand to fix any potential problems encountered.

Commentary

The response identifies three appropriate issues: computer downtime, personnel issues, and technical support. There is little discussion of the issues, with only general statements regarding their implications. The knowledge conveyed lacks some clarity.

Score Point 1

One issue I would make sure the installation goes smoothly by not giving my address to anyone, but myself.

Second issue is I would keep the software and the hardware locked so no one could go into it, like other employees.

The third issue is I would have my employees sign up on a list so I will know who has been going into the hardware and software.

This consideration could be handled if each employee that is using the computer uses it carefully.

Commentary

Although this response attempts to list three issues, they all relate to a single issue (i.e., personnel access to the system) and include little substance. Overall, the response shows minimal understanding of the types of problems that might be encountered in the installation and configuration of a computer system. The knowledge conveyed lacks some clarity and focus.

Acknowledgments

Thank you to all of the students, teachers, school officials, representatives of higher education, and representatives of industry who have contributed to the development of the Assessments in Career Education (ACE). The ACE examinations are voluntary and rely on your cooperation and continuing support. Students contribute by making their best effort on the examinations. Teachers prepare students and encourage their success. School officials provide support by registering their districts and schools for the ACE examinations, acknowledging the importance of these career areas and understanding the need to recognize student achievement. Higher education and industry representatives ensure that the content of the examinations provides an appropriate foundation for further education, training, and work in a related career area.

We wish to acknowledge the members of the development and scoring leadership teams for their contributions to the ACE in Computer Science and Information Systems.